The sculpture has mostly been eroded, but in parts the sculpture remains, resembling that of other members of the genus.

Bathytoma clarkiana if restored, would measure 116 mm, over all, the body whorl measuring 68 mm, the spire 48 mm.

The photos submitted to you have also been sent to the scrutiny of Dr. R. H. Tremper of Ontario, and his reply reads thus;—"The photo is very interesting. I suspect your shell represents some extinct form of Bathytoma. I have not seen a specimen of this genus so long, nor so attenuate. Your fossil is not *B. tremperiana* of Dall. The latter is a very different shell and very much smaller, good-sized specimens measuring 67 mm.; body whorl 82 mm., spire 35 mm., making the body whorl shorter than the spire, while in your specimen the body whorl measures 68 mm., and the spire 48 (if restored)."

STUDIES IN NAJADES.

BY A. E. ORTMANN.

(*Continued from page 47.*)

ALASMIDONTA (PEGIAS) FABULA (Lea) (See: *Pegias f.* Simpson, 1900, p. 661).

Three males and two gravid females (with glochidia) from North Fork Holston River, Saltville, Smyth Co., Va., collected Sept. 17, 1912.

Anal opening separated from the supraanal by a well developed, but rather short mantle-connection. Inner edge of anal crenulated, that of branchial with papillae. Posterior margins of palpi connected for about one third of their length.

Inner lamina of inner gills free in about the posterior half of the length of the abdominal sac, or a little more, so that the connection in front is distinctly longer than usual. Gills of Anodontine structure, in the female only the outer ones are marsupial, have lateral water canals, and are distended at the edge. The glochidia fill the ovisacs in a mass, which

does not form distinct placentae. Glochidia very large, of a specific, peculiar shape. They have the general Anodontine character, and possess the typical hooks, but the anterior and posterior margins are strongly convex, so that the hinge-line is considerably shorter than the length of the glochidium. The general shape thus becomes almost transversely elliptical, with the upper margin straight in the middle, the lower with a slightly projecting point, which bears the hook. Length 0.40, height 0.36 mm.

Color of soft parts whitish, mantle margin with square black spots posteriorly, entirely black on the inside of supraanal and anal.

The structure of the soft parts of this species is truly Anodontine, and does not show any essential differences from that of the genera *Symphynota, Anodonta, Anodontoides*, and *Alasmidonta*. Thus we are to rely only on the shell characters. The most important one, the beak sculpture, clearly places this species with the genus *Alasmidonta*, but the general shape of the shell, chiefly the peculiar truncation at the posterior end and the rather strong sexual dimorphism, give it a rather isolated position. Simpson created the genus *Pegias* for it, relying, as it appears, chiefly on the shape of the shell. But shape of shell is rather variable in the genus *Alasmidonta*, and I think enough justice is done to this, if we regard *Pegias* as a subgenus of *Alasmidonta*. The shape of the glochidia is unique, and although of the common Anodontine type, the triangular outline is changed, in consequence of the great convexity of the anterior and posterior margins, into a transversely elliptical. But since the glochidia also of other species of *Alasmidonta* show differences in shape, also this character is hardly of more than subgeneric value.

In Simpson's diagnosis of the genus *Pegias*, the radial depression in front of the posterior ridge is unduly emphasized: it is very faint, and indicated only in the female. The statement that anal and supraanal are not separated is not correct.

Amygdalonajas donaciformis (Lea) (*Plagiola d.* Simpson, 1900, p. 605).

One male and one gravid female, with glochidia, from Wabash River, New Harmony, Posey Co., Ind., collected by A. A. Hinkley, Aug. 8, 1912.

Soft parts agreeing with those of *A. elegans* (Lea), as described previously (Ortmann, l. c. p. 328). The posterior margins of the palpi are connected for about one-fourth of their length. Inner lamina of inner gills in both specimens connected with abdominal sac, leaving only a small hole open at posterior end of foot. Marsupium of the female formed by 25-30 ovisacs. Glochidia extremely small, subovate, agreeing in shape with those of *A. elegans*, but even a little smaller. Length 0.05, height 0.06 (in *elegans* they are said to be 0.075×0.09 mm.). These are the smallest glochidia known to me.

Proptera capax (Green) (See: *Lampsilis c.* Simpson, 1900, p. 529).

I have males and females of this species from Wabash River, New Harmony, Posey Co., Ind., collected by A. A. Hinkley, Aug. 8, and from the Mississippi River, Martins Landing, Rock Island Co., Ill., collected by Dr. Coker, October 5, 1912.

Coker and Surber (Biol. Bull. 20, 1911, p. 179, pl. 1, f. 4) have first discovered that this species has the glochidia of *Proptera*. Among both of my sets are gravid females with glochidia, and I have been able to confirm this, and to study the rest of the anatomy.

Mantle connection between anal and supraanal rather long, slightly longer than the anal, the latter crenulated; branchial with papillae. In the female, the inner edge of the mantle in front of the branchial is slightly lamellar, with few remote, fine crenulations, which resemble minute papillae posteriorly (near the branchial); but these "papillae" are in proportion to the size of the animal extremely small, much smaller than in the genus *Eurynia*; the lamellar edge is nowhere flap-like, as in *Lampsilis*, and runs forward about one-third

of the mantle margin, passing gradually into the smooth anterior section, of the edge. Posterior margins of the palpi connected for about one-third or one-half of their length.

Inner lamina of inner gills entirely connected with abdominal sac. Marsupium kidney-shaped, consisting of many ovisacs, located in the posterior section of the outer gill. Glochidia celt-shaped, agreeing with the figure given by Coker and Surber. Measurements length 0.09, height 0.18 mm. They are much smaller than those of *P. alata* (0.21 × 0.38), but about as large as those of *P. laevissima* (0.12 × 0.18), but the latter are more dilated at the lower margin.

Soft parts whitish throughout, with the mantle margin brownish-black, more intensely so posteriorly.

Nobody, except Coker and Surber, has doubted hitherto, that this species, according to the shape of the shell, is closely allied to *Lampsilis ovata* and *ventricosa*, in fact, the shape of the shell is very much like that of old females of *L. ventricosa*. Anatomical investigations has shown now, that this is no *Lampsilis* at all. It is a true *Proptera,* and a close examination of the shell reveals, that the resemblance to *L. ventricosa* is indeed only superficial. This is shown first of all in the character of the hinge teeth, of the ligament and the symphynote character of the upper margin, and then by the lack of a distinct differentiation of the male and female shell. In the female, the postbasal region is indeed slightly expanded; but this difference is very indistinct, in fact, I was unable to tell the males from the females, before I had looked at the soft parts: the sexes are even less distinct than in the other species of *Proptera.*

The present specimens show that glochidia are present at the beginning of August and the beginning of October, but they do not give an indication as to the duration of the breeding season.

Genus: Carunculina Simpson, 1898 (as subgenus, Simpson, 1900, p. 563, and Ortmann, 1912, p. 337).

I think now, that *Carunculina* is entitled to generic rank. Characters of the shell (chiefly the beak sculpture), and

characters of the soft parts (the "caruncle" in front of the branchial opening, and the inner lamina of the inner gills, which is more or less free) sufficiently distinguish it from *Eurynia*. In addition, there seems to be a difference, from *Eurynia*, in the glochidia, which are suboval, with the margins rather regularly curved, not much higher than long, and smaller in the two species of *Caruncnlina*, in which they are known. In *Eurynia*, subgenus *Micromya*, the glochidia are larger, distinctly higher than long, and nearly subspatulte, with the anterior and posterior margins nearly straight. In the typical *Eurynia* the glochidia are subovate, but larger and higher in proportion.

I have given (l. c.) *U. parvus* Barnes as type of the subgenus, while Simpson (1900) names *U. texasensis* Lea. However, when Simpson first published the subgenus (as section, in: Baker, Bull. Chicago Ac. Sci. 3, 1898, p. 109, misprinted as *Corunculina*), he used it only for one species, *U. parvus*, and this, consequently, is to be regarded as the type.

(*To be continued.*)

"PHYSA HETEROSTROPHA SAY" IN EUROPE.

BY CAESAR R. BOETTGER.

In the NAUTILUS, Vol. xxvii, No. 10, pp. 112-113, Mr. *Frankenberger* states that all the Physas lately introduced into Central Europe are not the European *Physa acuta Drap.* but the North American *Physa heterostropha Say.* He believes that *Babor* and *Novak* were the first to record this North American shell in the waters of Central Europe. This is not the case. In 1907 *D. Geyer* already mentioned (Jahreshefte des Vereins für Vaterl. Naturkunde in Württemberg, 1907, pp. 426) that it is possible that the ancestor of our form is *Physa heterostropha Say.* It may be that now and then *Physa heterostropha Say* is introduced into Germany with American fishes and plants of aquaristic commerce. But this must be very rare and the ex-